

Claims:

1. A system for implementing a Fast Fourier Transform (FFT) in a broad bandwidth, high data rate communications application, the system comprising:
means to divide the bandwidth into sub-bands; and
means to implement the FFT separately for each sub-band.
2. The system as defined in claim 1 further including pass band filters to isolate desired sub-band frequencies.
3. The system as defined in claim 2 having a modulator to process each sub-band separately prior to implementation of the FFT and up-sampling means in advance of the filter to up-sample a signal to the desired sampling rate.
4. The system as defined in claim 3 wherein said system is in a transmitter for transmitting Discrete Multi-tone (DMT) signals in a Digital Subscriber Line (DSL) application.
5. The system as defined in claim 3 for use in a Very high rate Digital Subscriber Line (VDSL) application.
6. The system as defined in claim 2 wherein said means to implement the FFT is an Inverse FFT (IFFT).
7. The system as defined in claim 6 wherein said system is in a receiver for receiving DMT signals in DSL application.
8. The system as defined in claim 6 for use in a receiver in a VDSL application.
9. A method of implementing a Fast Fourier Transform (FFT) in a broad bandwidth, high data rate communications application, the method comprising:
dividing the bandwidth into sub-bands; and

implementing the FFT separately for each sub-band.

10. The method as defined in claim 9 further including the step of providing pass band filters to isolate desired sub-band frequencies.
11. The method as defined in claim 9 wherein said FFT is implemented for only a single side band of said sub-bands.
12. The method of claim 11 wherein a single side band filter is used.
13. The method as defined in claim 10 including the step of providing a modulator to process each sub-band separately prior to implementation of the FFT.
14. The method as defined in claim 13 wherein an up-sampling means in advance of the filter up-samples a signal to the desired sampling rate.
15. The method as defined in claim 9 for use in a frequency division multiplexing application wherein a variable sized FFT is used for each individual band.
16. The method of claim 15 wherein variable up and down sampling rates are used for each individual band.